

**Work Order ID 58491**

May 7, 2010 1:47:20 PM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Item Name: Replacement Skidtube

Stop



Start Date: 07/05/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 20/05/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date: 10-5-07

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursDraw  
NumberDraw  
Rev.Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

Draw Nbr

Revision Nbr

D2580

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile &amp; type labels per PPP D205-634-041 CHG002

Subsidiary

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio FT009

2-Cut tubes as per Dwg. D2580

DP 10-5-12

58491

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							
Skidtubes	Memo	0.00							
Skidtubes	1- Deburr ends								
	2- C'sink holes as per dwg without cutting fluid								
	3- Prepare tube for welding, remove alodine as required.								
	4- Scribe batch number insied aft end of tube.								
130	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control									

①

BE 10/05/13

8 10/05/12

②

W/O:		WORK ORDER CHANGES					
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Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Draw Number	Draw Rev.	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004  
A/R□□□ Aluminum Rod *m112860*

*BE 10/05/13*

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.

For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill  
A/R□□□ Aluminum Rod *m112860*

*BE 10/05/13*

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64",  
adjust stopper not to hit web. Debur

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580.  
Debur holes

*M 10/5/17*

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Debur

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

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Run HoursDraw  
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QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

QC10- Inspect visual per QSI004- ground welds

0.00



QC

Memo

0.00

Quality Control

8 10/05/10

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8 10/05/10

170

Pressure Wash per QSI005 4.3

0.00



HandFinish

Memo

0.00

Hand Finishing

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.

D BR 10-51 10/1

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Run Start



Stop



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180  Powdercoat Powder Coating	White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum  Memo START TIME: 11:00AM OVEN TEMPERATURE: 320°F FINISH TIME: 11:30AM	0.00 0.00							
						L	Ø		
190  QC Quality Control	QC3- Inspect Part Finish  Memo	0.00 0.00							
						Q1	10	05	20 @

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200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates

A/R ☐ ☐ ☐ Sikaflex-291 ☐ M112429 ☐ ☐

Sikaflex expire date: 10-08

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R ☐ ☐ ☐ Sikaflex-291 ☐ M112429 ☐ ☐

Sikaflex expire date: 10-08

5-Wing Walk as per Dwg D2580 and QSI 005 4.4

Batch: M 104432

A.M. 10.05.20

①

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



Stop



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210	QC5- Inspect part completeness to step on W/O	0.00							
QC	Memo	0.00							
Quality Control	Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024								
220	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPPD205-634-041								
	Location: _____								
	PPP Rev: <u>I</u>								
230	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

*PPPD205-634-041*

*MF 10-5-21*

W/O:		WORK ORDER CHANGES					
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Work Order ID: 58491



Parent Item: D205-634-041



Parent Item Name: Replacement Skidtube

Start Date: 07/05/2010

Required Date: 20/05/2010

Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ  
 IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD  
 IPP Rev. O 06.02.28 Added paperwork EC  
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2580-1 Manufactured No 110 Each 9.0000 1



205 Skidtube bent detail

*B58384* *1* *DD* *10-5-12*

Location	Loc Qty	Loc Code
LG	9	
57028	1	
57347	1	
57902	1	
57938	2	
58090	2	
58112	2	

D2576-3 Manufactured No 140 Each 110.0000 1



Step (maching detail)

Location	Loc Qty	Loc Code
LG	110	
46661	62	
52215	48	

*1* *BE 10/05/13*

D2579 Manufactured No 140 Each 193.0000 20



Crossbolt Spacer

Location	Loc Qty	Loc Code
LG	193	
57052	13	
57348	180	

*20* *BE 10/05/13*

W/O:		WORK ORDER CHANGES					
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Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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 IPP Rev: P 07-07-09 SS Wearplates & Gaskets JLM

Start Date: 07/05/2010

Required Date: 20/05/2010

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No 200 Each 105.0000 1



Cap

Q.M 10-05-20

Location	Loc Qty	Loc Code
FP6	2	
56613	2	
ST026	103	
50513	1	
50770	29	
51539	19	
53791	54	

AN3-5A Purchased No 200 Each 963.0000 2



Bolt

Q.M 10-05-20

Location	Loc Qty	Loc Code
ST350	963	
105057	963	

AN960JD10L Purchased No 200 Each 4,297.000 2



Washer

Q.M 10-05-20

Location	Loc Qty	Loc Code
ST348	4297	
110985	4297	

ALS7-1032-130 Purchased No 200 Each 17.0000 50



Insert

ALS4-1032-130

Q.M 10-05-20

Location	Loc Qty	Loc Code
ST282	17	
113238	17	

50

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Shop Packet Print

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Start Qty: 1.00

Required Qty: 1.00

AN3C4A

Purchased

No

200

Each

1,939.000

50



BOLT



Q.M 10-05-200

Location

Loc Qty

Loc Code

ST350

1939

114103

501

114108

300

114416

138

114523

1000

AN960C10L

Purchased

No

200

Each

0.0000

50



washer

NAS1149C0332R

114348



50 Q.M 10-05-200

D3566-13

Manufactured

No

200

Each

33.0000

1



Gasket



53461 Q.M 10-05-200

Location

Loc Qty

Loc Code

FP

33

53461

33

D3566-5

Manufactured

No

200

Each

21.0000

1



Gasket



57582 Q.M 10-05-200

Location

Loc Qty

Loc Code

FP015

21

57526

1

57682

20

2

W/O:		WORK ORDER CHANGES					
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 IPP Rev: P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D3566-1 Manufactured No 200 Each 41.0000 2



Gasket



Q.M. 10-05-200

Location	Loc Qty	Loc Code
FP015	41	
57715	20	
58182	21	

D3564-11 Manufactured No 200 Each 9.0000 1



Wearshoe



Q.M. 10-05-200

Location	Loc Qty	Loc Code
FP019	9	
57957	9	

D3564-13 Manufactured No 200 Each 27.0000 1



Wearshoe



Q.M. 10-05-200

Location	Loc Qty	Loc Code
FP17	27	
56533	1	
57684	12	
57922	14	

1353461

W/O:		WORK ORDER CHANGES					
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 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D3564-9 Manufactured No 200 Each 22.0000 1



Wearshoe



Q.M 10-05-200

Location	Loc Qty	Loc Code
FP	1	
55334	1	
FP019	21	
57685	7	
57958	14	

D3564-5 Manufactured No 200 Each 7.0000 1



Wearshoe



Q.M 10-05-200

Location	Loc Qty	Loc Code
FG	1	
34806	1	
FP19	6	
57525	1	
57729	5	

D2594-3 Manufactured No 200 Each 407.0000 16



O-Ring, 205 Skidtube



Q.M 10-05-200

Location	Loc Qty	Loc Code
FP	407	
55546	19	
58191	388	

16

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Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ  
IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD  
IPP Rev. O 06.02.28 Added paperwork EC  
IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Start Qty: 1.00

Required Qty: 1.00

D2594-1

Manufactured No

200

Each

382.0000

16



Plug, 205 Skidtube



Q.M 10-05-20 ①

Location

Loc Qty

Loc Code

FP

382

42807

112

55002

128

57826

142

?

7

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**DART**

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

**RELEASED**  
07.06.28 *[Signature]*

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED  
SUBJECT TO AMENDMENT  
WITHOUT THE  
WORK ORDER  
NO. 58491

*BS10-5-07*

**GENERAL NOTES:**

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL  $\varnothing 0.297$  HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:  
SEE NOTES ON  
PAGE 2 FOR D2580-041 AND  
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

RELEASED  
07-06-28

Diagram illustrating the grinding locations for the propeller. The diagram shows a cross-section of the propeller with the following labels:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- LOCATION RIDGE ON UNDERSIDE OF D2576

Diagram illustrating the rear view of the engine cover assembly. The diagram shows the following components and dimensions:

- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)**: Indicated by two small circles on the cover.
- AN3-5A BOLT (1)**: A bolt passing through the center of the cover.
- AN960/D10L WASHER (1)**: A washer located between the bolt and the cover.
- D2855 CAP**: The cap being installed on the rear of the cover.
- SEAL WITH SIKAFLEX-241/-291**: A sealant applied to the joint between the cap and the cover.
- 0.208**: Dimension indicating the distance from the center of the bolt to the edge of the cover.
- 0.40**: Dimension indicating the thickness of the cover.

Diagram illustrating the cross-section of a wheel assembly. Labels include:

- D2579 SPACER
- D2596 WEB (REF)
- ALS7-1032-130 (REF) (TYP 50 PLACES)
- AFTER PERFORM
  1. CHA
  2. INS
  3. WE
  4. C'B

AFTER DRILLING AND BENDING ASSEMBLY  
PERFORM THE FOLLOWING FOR Ø0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO Ø0.437 X 1.00 DEEP

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

Diagram showing the elevation view of the bridge deck. Key dimensions and features include:

- Deck width: 37.50
- Distance to aft end of D2598 web: 3.75
- Reinforcement: #0.508 (TYP.) (40 PLACES)
- Reference to Detail A: Two locations are indicated by circles and arrows.
- Dimensions from the left edge to the centerline:
  - 38.0
  - 34.188
  - 26.000
  - 17.375
  - 8.750
- Dimensions from the centerline to the right edge:
  - 1.750
  - 1.750
  - 57.313 (REF) 7 EQUAL SPACES 8.188 PITCH
  - 91.500
  - 190.0 (D2500-1)

0.5 1.5 1.5 D

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

WELD AS PER DETAIL B

8

1.5 1.5 1.5

P P P P P P P

REFER TO DETAIL C

D3566-1 D3566-5 D3566-1 D3566-13





D3564-11 D3564-5 D3564-9 D3564-13

AN3C4A BOLT (1)  
AN960C10L WASHER (1)  
(50 PLACES)

DESIGN DRAWN BY

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CHECKED		APPROVED	
DATE			
07.02.27			

**DART** DART AEROSPACE LTD.  
HAMPSHIRE, ONTARIO, CANADA

DRAWING NO.	REV. D
D2580	SHEET 2 OF 3
TITLE	SCALE
205 SKIDTUBE ASSEMBLY	1:24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

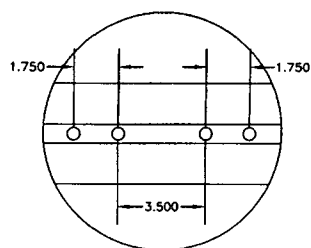
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

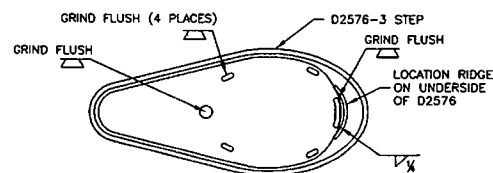
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**DETAIL E**  
SCALE 5:24

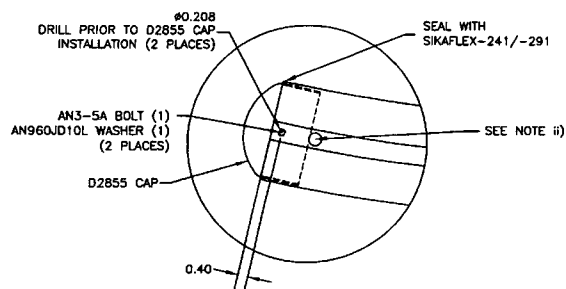


**DETAIL F**  
SCALE 5:24

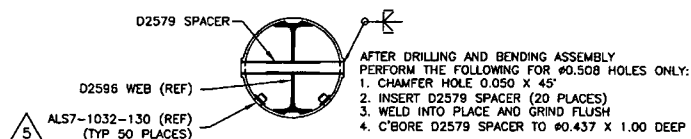


**RELEASED**  
07.02.27

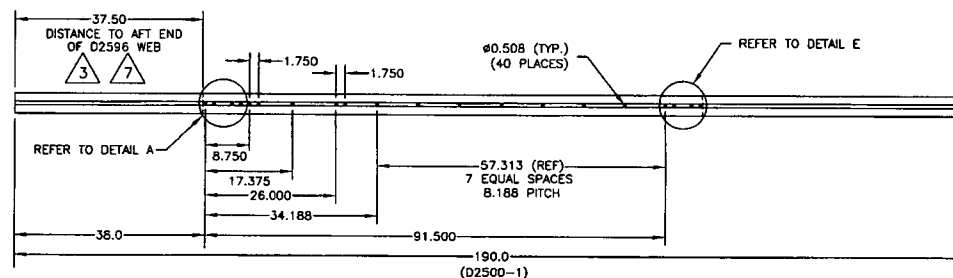
**DETAIL G**  
SCALE 5:24



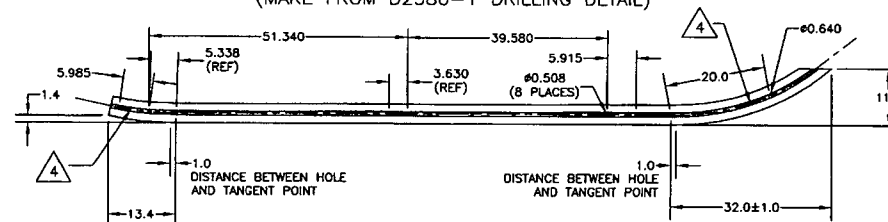
**SECTION H-H**  
SCALE 5:24



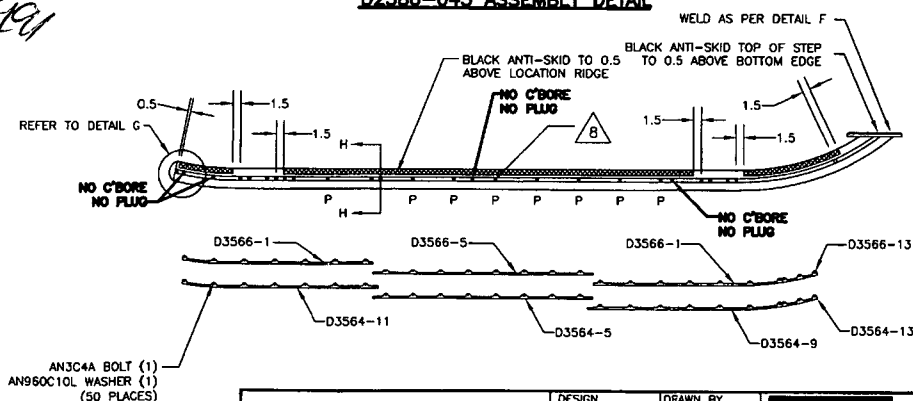
**D2580-1 DRILLING DETAIL**



**D2580-5 BENDING AND CUTTING DETAIL**  
(MAKE FROM D2580-1 DRILLING DETAIL)



**D2580-045 ASSEMBLY DETAIL**



**D2580-045 NOTES**

- FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3 BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4
- IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE WITH THE SPACER AT THIS LOCATION

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CHECKED H	APPROVED H	DRAWING NO. D2580	REV. D SHEET 3 OF 3
DATE 07.02.27	TITLE 205 SKIDTUBE ASSEMBLY	SCALE 1:24	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

NO. 232

AWS D17.1.2001  
QUALIFICATION TEST RECORD

Name: Barclay Elliott  
Job number: 58508  
Part number: D205 634 041  
Description: 205 tube  
Welding Process: Tig[☒] Mig[ ]  
Base material: Aluminium  
Current: AC[☒] DC[ ]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[ ]  
Penetration: pass[☒] fail[ ]

UNACCEPTABLE

Cracks: pass[☒] fail[ ]  
Undercut: pass[☒] fail[ ]  
Pin holes: pass[☒] fail[ ]  
Overlap (cold lap): pass[☒] fail[ ]  
Porosity (surface): pass[☒] fail[ ]  
Coloration: pass[☒] fail[ ]

Qualifier [Signature] Date of Test Coupon 10.05.18  
Welder Barclay Elliott Date of Test Coupon 10.05.18

The above named individual is qualified in accordance with AWS D17.1.2001 to weld

47MC